Remarks/Arguments

(Item 1) Examiner objects to the disclosure because it contains information not described in the parent application as originally filed, in particular, paragraph [27] and the abstract. The Abstract is objected to as being unclear in **Item 2** (see below) and has been amended. Applicant believes that the information does not add new material, and was entered by amendment during the First and Second Office Actions during the prosecution of the patent application as originally filed, as detailed below:

Amendments made in OA1

Abstract was amended as follows:

A high phase order induction machine drive system is disclosed[, comprising an induction motor having more than three phases, and having at least two terminals for each phase, and wherein each terminal is connected to at least one terminal of another phase, and an inverter for synthesis of power of a plurality of phases, drivingly connected to each of the set of connected terminals, and control electronics for adjusting the phase angles of the inverter to the connected terminals to change the impedance of the motor]. This has an inverter system for the synthesis of a plurality of phases of alternating current output, and a N-phase induction motor (N is greater than 3). The motor is connected to the inverter terminals so that each motor phase is electrically connected to a first inverter terminal and a second inverter terminal S+1 inverter terminals distant from the first inverter terminal in order of electrical phase angle (S in the skip number). The phase angle difference between the pair of inverter terminals to which each motor phase is connected is identical for each motor phase.

Paragraphs [18] and [19] were amended as follows:

[18] Figures 2A-E illustrate[s]

[19] Figures 3A-D illustrate[s]

Amendments made in OA2

Paragraphs [23] to [26] were amended as follows:

[23] A simple graphical schematic of the permissible inverter to motor windings connections may thus be described[,] for a polyphase motor having N phases. In the following embodiment, N is equal to 9, but it is to be understood that this limitation is made to better illustrate the invention; other values for N are also considered to be within the scope of the present invention. Fig. 2a shows 9[N] evenly spaced [points]terminals 4 and a center [point]terminal 6. Each of the terminals 4[se points] represent[s] one end of a motor winding 1 and the center terminal 6 represents the other end of the motor winding. A[a]n inverter 5 has 9 terminals 2, [to]which are connected to one of the terminals 4 of each of [one or more]the motor windings 1 via electrical connectors 3 as shown[may be connected].

[24] Permissible connections of the 9[N] phase windings are either from the center point, to each of the 9[N] points on the circle (this being the star connection shown as Fig. 2a) or from each of the 9[N] points to another point S skipped points distant in the clockwise direction, where S represents the number of skipped points (inverter terminals). This latter is shown in Figs. 2b-e; in Fig. 2b motor winding 1 is represented by a line, and in Figs. 2c-e inverter 5 and electrical connectors 3 have been omitted for the sake of clarity. It will be noted that for each S from 0 to [N/2-1]3 there is a corresponding S from 4[N/2-1/2] to 7[N] that produces a mirror image connection.

[25] Fig. 2 shows all permissible connections for a 9 phase system from S=0 to S=[N/2-1]4 as well as the star connection. Noted on the star connection diagram (Fig. 2a) are the relative phase angles of the inverter phases driving each terminal. For a given inverter output voltage, measured between an output terminal 2 and the neutral point, 6 each of these possible connections will place a different voltage on the connected windings. For the star connection, the voltage across the connected windings is exactly equal to the inverter output voltage. However, for each of the other connections (Figs. 2b-e), the voltage across a winding is given by the vector difference in voltage of the two inverter output terminals 2 to which the winding 1 is connected. When this phase difference is large, then the voltage across the winding will

be large, and when this phase difference is small, then the voltage across the winding will be small. It should be noted that the inverter output voltage stays exactly the same in all these cases, just that the voltage difference across a given winding will change with different connection spans. The equation for the voltage across a winding is given by: 2*sin((phasediff)/2)*Vout where phasediff is the phase angle difference of the inverter output terminals driving the winding, and V is the output to neutral voltage of the inverter.

[26] Thus, referring to Fig. 2, when S=0, the phase angle difference is 40 degrees, and the voltage across a winding is 0.684Vout. When S=1 (Fig. 2c), the phase angle difference is 80 degrees, and the voltage across the winding is 1.29Vout. When S=2 (Fig. 2d), the phase angle difference is 120 degrees, and the voltage across the winding is 1.73Vout. Finally, when S=3 (Fig. 2e), the phase angle difference is 160 degrees, and the voltage across the winding is 1.97Vout. For the same inverter output voltage, different connections place different voltage across the windings, and will cause different currents to flow in the windings. The different mesh connections cause the motor to present a different impedance to the inverter.

Paragraph [27] was new:

[27] As disclosed above, in an induction machine, each motor winding set can be described by two terminals. There may be a larger number of terminals, but these are always grouped in series or parallel groups, and the entire set can be characterized by two terminals. Thus whilst Fig. 2 discloses a single motor winding 1 connected to terminals 4 and 6, it is to be understood that this limitation is made to better illustrate the invention; multiple phase windings connected between the terminals are also considered to be within the scope of the present invention.

Figs. 2a and 2b were replaced with Figs. 2a and 2b.

(Item 2) Examiner objects to the abstract because the portion related to the skipped terminals is unclear. Applicant has amended the abstract accordingly and requests that Examiner withdraw objection.

(Item 3) Examiner objects to the drawings as not showing an inverter system connecting its terminals (first and second) to the motor phases. Referring to Figure 2b, each motor winding is shown as connecting its two terminals (first and second) to the inverter system. This is also described in paragraphs [24] and [25]. Applicant requests Examiner withdraw objection under 37 CFR 1.83(a).

(Item 4) Examiner objects to claims 1 and 2 because the same reference character is used to indicate steps 1, 2 and 4. Applicant has amended claim 1 accordingly, and requests Examiner withdraw objection.

(Item 6) Examiner objects to the description of the invention because it does not support the subject matter of claims 2 to 14.

Applicant has added new paragraph [11.1] to include the language of claims 1 and 2, amended paragraph [35] to include the language of claims 3 – 5; and amended paragraph [38] to include the language of claim 6 and 11. No new material has been added by these amendments.

Applicant has amended claims 7 – 10 so that they are more accurately supported by the description of the invention. Claim 14 has been cancelled without prejudice.

Claim 2 is supported by new paragraph [11.1]; claims 3 – 5 are supported by amended paragraph [35]; claim 6 is supported by amended paragraph [38]; amended claims 7 – 10 are supported by paragraph [36]; claim 11 is supported by amended paragraph [38]; claim 12 is supported by amended paragraph [35]; and claim 13 is supported by amended paragraph [38].

Applicant requests Examiner withdraw rejection of claims 2 – 14 under 35 USC 122, first paragraph.

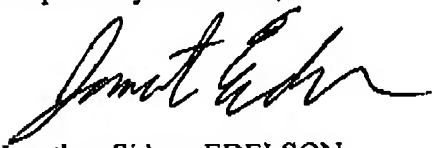
(Item 8) Claims 1 and 2 stand rejected as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In particular, step a(ii) is unclear. Applicant has included the limitations of claim 2 into claim 1 as suggested by the Examiner. Applicant requests Examiner withdraw rejection of claims 1 and 2 under 35 USC 122, second paragraph.

(Item 10) Claims 1 and 14 stand rejected under 35 USC 102(b) as being anticipated by Liska (US 3930190). Examiner states that Liska teaches a method for controlling a multi-phase motor. However, the instant application is directed at a method for varying the impedance of a motor. This is achieved by varying the phase angle difference between a first terminal and a second terminal. The effect on motor impedance by changing the phase angle difference is disclosed in paragraphs [23] – [35] of the instant application. Nowhere in his disclosure does Liska teach that his invention changes the impedance of the brushless dc motor. Accordingly, Applicant respectfully requests that Examiner withdraw rejection of claims 1 and 14.

(Item 11) Claims 1 and 14 stand rejected under 35 USC 102(e) as being anticipated by Isozaki et al (US 6153953). Examiner states that Isozaki et al teach a method for controlling a multi-phase motor. However, the instant application is directed at a method for varying the impedance of a motor. This is achieved by varying the phase angle difference between a first terminal and a second terminal. The effect on motor impedance by changing the phase angle difference is disclosed in paragraphs [23] – [35] of the instant application. Nowhere in their disclosure do Isozaki et al teach that their invention changes the impedance of the multiphase PM-type stepping motor. Accordingly, Applicant respectfully requests that Examiner withdraw rejection of claims 1 and 14.

Applicant respectfully submits that this application, as amended, is in condition for allowance, and such disposition is earnestly solicited. Applicant has not introduced any new material by the amendments made. If the Examiner believes that discussing the application with the Applicant over the telephone might advance prosecution, Applicant would welcome the opportunity to do so.

Respectfully submitted,



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